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(54) Title: APPARATUS AND METHODS FOR FORWARDING AND HANDLING TELEPHONIC MESSAGES OVER A DATA NETWORK
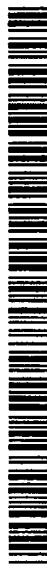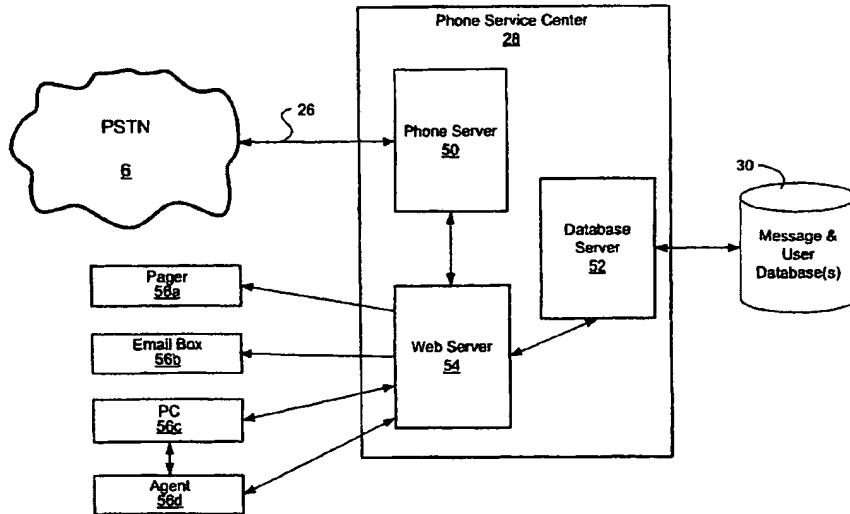
(57) Abstract: Disclosed is a method for handling telephonic messages within a data network. A forwarded call is received from a caller. The forwarded call is intended for a particular user. A voice message associated with the forwarded call is stored in a format that is accessible through a data network by the particular user. In one embodiment, the particular user is notified that the forwarded call has been received. In a preferred embodiment, the user is notified through the data network when the user is in communication with the data network. In other embodiments, the user is notified via an email message, a chat message, a pager, or through agent software residing on a computer being used by the particular user.

APPARATUS AND METHODS FOR FORWARDING AND HANDLING TELEPHONIC MESSAGES OVER A DATA NETWORK

BACKGROUND OF THE INVENTION

The invention relates to apparatus and methods for handling telephonic calls
5   from a caller. More specifically, it is related to mechanisms for handling telephonic calls that are forwarded from a caller to a call handling system so that the intended call receiver is bypassed.

Various mechanisms exist for handling calls that are placed to a call receiver who is not picking up her calls (*e.g.*, the receiver is currently engaged in another
10 conversation or not at home). For example, most telephone companies now provide message centers for storing voice messages. If the user signs up for a call forwarding service, calls may be forwarded to the message center when the user's telephone is busy or not answering calls. The caller may then leave a voice message at the message center that can later be accessed by the user or intended call receiver. In
15 other words, the message center acts like a common telephone answering machine.

These message centers have several associated disadvantages. For example, the message centers typically have limited storage capabilities for each user. Additionally, a user usually must sequentially access her calls one at a time. Thus, these message centers do not provide very efficient mechanisms for storing and
20 accessing voice messages.

Other messaging centers provide a subscriber with a dedicated phone number through which a caller leaves messages for the subscriber. That is, when the subscriber's original phone line (*e.g.*, home number) is busy, friends or colleagues

may leave voice messages for the subscriber via the subscriber's message center phone number. Unfortunately, friends and colleagues of each user must memorize special message center phone numbers for each of their friends and colleagues that are signed up for the message center service. Along with original home and office

5   numbers, pager numbers, and cellular phone numbers, an additional message center number just adds to the already burgeoning list of numbers that each person has to memorize.

The message center approaches described above have associated disadvantages. For example, although messages are stored when the line is busy or

10 no one is answering, the user is not notified when a call has been attempted. In certain cases, it may be imperative that the caller immediately reach the user. The above described conventional message center approaches fail to provide such a user notification feature.

Another approach to handling calls of a user or subscriber is described in U.S.

15 Patent No. 5,809,128 by McMullin. When a subscriber's telephone line is connected to a data network (e.g., the subscriber is using his computer to access the Internet), a call to the subscriber is redirected to a subscriber proxy. The subscriber proxy interacts with the caller by playing selected prerecorded messages. The subscriber proxy also notifies the subscriber that a caller is attempting communication. The

20 subscriber may respond in several ways, and the subscriber's response is communicated to the caller via a prerecorded message that is selected by the subscriber. For example, the subscriber selects a prerecorded message that tells the caller that the subscriber is going to disconnect from the data network and the caller can try to call again in a few minutes when the line is free. Alternatively, the

subscriber selects a prerecorded message that simply indicates that the subscriber's line is busy.

Although the McMullin approach provides mechanisms for notifying a user of incoming calls when the subscriber is connected to a data network, this approach also has several disadvantages. When the user is not coupled to the data network, there are no mechanisms for notifying the user of attempted calls nor for providing access to messages that do not reach the user. Additionally, even when the user is connected to the data network, she must disconnect to receive a call. The user has no way of distinguishing between important and unimportant calls prior to disconnecting from the data network and receiving the call.

Thus, mechanisms for more efficiently and flexibly handling forwarded calls and voice messages are needed. More specifically, mechanisms for notifying a user of incoming calls and/or providing access to messages while the user is still connected to a data network are needed.

SUMMARY OF THE INVENTION

Accordingly, the present invention addresses the above problems by providing apparatus and methods for handling forwarded calls and voice messages. In general terms, calls placed to a user are forwarded to a phone center. Voice messages are

5   stored in a format that is accessible by a user over a data network, such as the Internet. For example, the user may play the stored messages on her home computer. The user may then be notified that a call has been forwarded when the user is connected to the data network.

In one embodiment, the invention pertains to a method for handling telephonic

10   messages within a data network. A forwarded call is received from a caller. The forwarded call is intended for a particular user. A voice message associated with the forwarded call is stored in a format that is accessible through a data network by the particular user. In one embodiment, the particular user is notified that the forwarded call has been received. In a preferred embodiment, the user is notified through the

15   data network when the user is in communication with the data network. In other embodiments, the user is notified via an email message, a chat message, a pager, or through agent software residing on a computer being used by the particular user.

In another embodiment, a request is received from the particular user to set up call forwarding and the particular user is automatically signed up for call forwarding

20   when the request is received. In a particular embodiment, the particular user is automatically signed up for call forwarding by determining the particular user's area code, determining which telephone companies are associated with the particular user's area code (*e.g.*, the local telephone companies), displaying the associated

telephone companies to the particular user so that the particular user may select a telephone company, and sending an order for call forwarding to the selected telephone company after the particular user makes a selection. In yet another embodiment, the order is tracked to determine when the order is accepted by the

5   selected telephone company and the particular user is contacted to indicate that their order was accepted when the selected telephone company accepts the order.

In another aspect, the invention pertains to a computer readable medium containing computer codes for handling telephonic messages within a data network. The computer readable medium includes computer code for receiving a forwarded

10   call from a caller. The forwarded call is intended for a particular user. The computer readable medium also includes computer code for storing a voice message associated with the forwarded call in a format that is accessible through a data network by the particular user. In another embodiment, the computer readable medium also includes computer code for notifying the particular user that the forwarded call has been

15   received.

In another aspect, the invention pertains to a method for accessing a database of a first computer system through a data network. The database is arranged to hold voice messages received through a first telephone line. The data network is accessed from a second computer system via a second telephone line. A notification from the

20   first computer system indicating that a telephonic call that was initially directed to the second telephone line has been forwarded to the first telephone line is listened for. After receiving the notification, the database of the first computer system is accessed to determine whether a voice message corresponding to the forwarded call has been

stored. The database is accessed without disconnecting the second computer system from the data network.

In another embodiment, the invention pertains to a computer readable medium containing computer codes for accessing a database of a first computer system

5   through a data network. The database is arranged to hold voice messages received through a first telephone line. The computer readable medium includes computer code for accessing the data network from a second computer system via a second telephone line and computer code for listening for a notification from the first computer system. The notification indicates that a telephonic call that was initially

10   directed to the second telephone line has been forwarded to the first telephone line. The computer readable medium also includes computer code for accessing the database of the first computer system to determine whether a voice message corresponding to the forwarded call has been stored after receiving the notification. The database is accessed without disconnecting the second computer system from the

15   data network.

In a preferred embodiment, the computer readable medium also includes computer code for checking the database for voice messages prior to listening for the notification indicating that a telephonic call has been forwarded. In yet another embodiment, the computer readable medium includes computer code for playing the

20   voice messages on the second computer system when voice messages are present in the database. In yet a final embodiment, the computer readable medium further includes computer code for playing the voice message corresponding to the forwarded call when the voice message has been stored.

In another embodiment, a method for automatically signing up a subscriber for call forwarding is disclosed. A database having a plurality of area codes that are each associated with one or more telephone companies that serve the each area code is maintained. A request is received from a particular user to sign up for call

5   forwarding. The request includes a user phone number and a user area code for which the particular user wishes call forwarding activated. The database is searched for the user area code and corresponding telephone companies that serve such user area code when the request is received. The telephone companies that serve the user area code are presented to the particular user. When the particular user selects a one

10   of the presented telephone companies, an order for call forwarding to be activated for the user phone number is placed. The order is placed with the selected telephone company. In another embodiment, the database also includes setup and monthly fee information for the call forwarding service. This information may be directly provided or provided through a third party.

15   In another aspect, the invention pertains to a computer readable medium containing computer codes for automatically signing up a subscriber for call forwarding. The computer readable medium includes computer code for maintaining a database having a plurality of area codes that are each associated with one or more telephone companies that serve the each area code and computer code for receiving a

20   request from a particular user to sign up for call forwarding. The request includes a user phone number and a user area code for which the particular user wishes call forwarding activated. The computer readable medium also includes computer code for searching the database for the user area code and corresponding telephone companies that serve such user area code when the request is received, computer code

25   for presenting the telephone companies that serve the user area code to the particular

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user, and computer code for placing an order for call forwarding to be activated for the user phone number when the particular user selects a one of the presented telephone companies. The order is placed with the selected telephone company.

In another embodiment, an apparatus for handling forwarded telephonic
5   messages is disclosed. The apparatus includes a database manager arranged to maintain a database of user information for a plurality of users and a plurality of associated user identifications and a database of formatted messages associated with forwarded calls of the users. The apparatus also has a forwarded call handler arranged to receive a first forwarded call that is originally directed at a first call
10   receiver that is associated with a first user The first call receiver is configured to forward calls to the phone call handler The forwarded call handler is also arranged to format a first voice message associated with the first forwarded call and direct the database manager to store the first formatted voice message within the message database such that they are retrievable by the first user over a data network. The
15   apparatus also includes a data network interface arranged to provide access to the first formatted message within the message database by the first user over the data network.

The present invention provides several advantages. Several of the described embodiments provide mechanisms to notify a user of forwarded messages when the
20   user is connected to a data network. Since the forwarded messages are stored in a format that is accessible by the user through a data network (*e.g.*, a RealAudio sound file or any other compressed audio format such as GSM or True Speech), the user may then choose to play the message while she is still logged into the data network without disconnecting first. The user may then better assess whether to contact the

caller, as compared to conventional notification systems that simply notify that a call

is being attempted without providing any information regarding the nature of the call.

Additionally, since the messages are stored in a format that is readily

accessible through a data network, the messages may be accessed by the user from

5   any remote site (in addition to accessing from the called site) that has access to the

data network. For example, the user may utilize a remote computer to retrieve and

play stored messages via a web page or email box. Alternatively, the user may

retrieve messages using a regular phone to call the message center.

By way of a final example, friends and colleagues that wish to reach the user

10   may simply call the user's original phone number. In other words, the callers do not

have to memorize a special phone number, in addition to the user's original phone

number, that is specifically used only for recording voice messages to the user when

the user is unreachable at the original phone number. In sum, the present invention

provides an elegant solution to the problem of handling telephonic calls to an

15   unreachable user.

These and other features and advantages of the present invention will be

presented in more detail in the following specification of the invention and the

accompanying figures which illustrate by way of example the principles of the

invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements, and in which:

5   Figure 1A represents a data networking architecture for forwarding and handling voice messages in accordance with one embodiment of the present invention.

Figure 1B is a diagrammatic representation of the phone service center of Figure 1A in accordance with one embodiment of the present invention.

10   Figure 2 is a flowchart representing a process for handling forwarded calls in accordance with one embodiment of the present invention.

Figure 3 is a flowchart representing the process for setting up an agent on a user's computer in accordance with one embodiment of the present invention.

Figure 4 is a flowchart representing the operation of Figure 2 of notifying the
15   user in accordance with one embodiment of the present invention.

Figure 5 is a flowchart representing a process for automatically signing a user up for call forwarding in accordance with one embodiment of the present invention.

Figures 6A and 6B illustrate a computer system suitable for implementing embodiments of the present invention.

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

Reference will now be made in detail to the specific embodiments of the invention. Examples of these specific embodiments are illustrated in the accompanying drawings. While the invention will be described in conjunction with

5   these specific embodiments, it will be understood that it is not intended to limit the invention to the described embodiments. On the contrary, it is intended to cover alternatives, modifications, and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims. In the following description, numerous specific details are set forth in order to provide a thorough

10   understanding of the present invention. The present invention may be practiced without some or all of these specific details. In other instances, well known process operations have not been described in detail in order not to unnecessarily obscure the present invention.

In general terms, the present invention provides mechanisms for handling

15   forwarded calls of a particular user that are forwarded under various conditions. For example, the user's calls may be forwarded when the line is busy, no one is answering the call, or the user has set up all incoming calls to be forwarded (*e.g.*, for a specific period of time). The calls are forwarded to a message center and voice messages are then recorded and formatted. The voice messages are formatted such

20   that the user may access the messages via any suitable data network. Mechanisms may also be provided for notifying the user that a call has been forwarded to the message center. In several embodiments, the user is notified while he is still coupled to the data network at his home site (if he has such home access). The user may also

access his messages through a remote computer via the data network. These and other notification and access mechanisms are described further below.

Figure 1A represents a data networking architecture 2 for forwarding calls and handling voice messages in accordance with one embodiment of the present

5   invention. As shown, the data networking architecture 2 includes a data network in the form of the Internet 4 and a telephone network in the form of a public switch telephone network (PSTN) 6. A plurality of sites (not shown) are coupled with the PSTN and/or the Internet 4. As shown, Site A (20) and Site B (10) are coupled to PSTN 6. Although Sites A and B are shown to have access to the Internet through

10   PSTN, of course, these sites could also bypass the PTSN to access the Internet directly (e.g., through a cable modem or through a direct connection, such as within a corporate environment). Also, a particular site may not even have access to a data network.

Site B (10) includes a telephone 12 and a computer 14 coupled to a single

15   telephone line 16. In this example, when the computer 14 is accessing the telephone line 16, the telephone 12 generally cannot also access the same telephone line 16. The telephone line 16 is also coupled with PSTN 6 through Local Exchange Carrier (LEC) 8. The LEC 8 is typically coupled with a plurality of local sites (not shown). Other users may initiate communication with site B through LEC 8. In the illustrated

20   embodiment, site A (20) includes a telephone 22 which may be used to communicate with telephone 12 of site B through telephone line 24, PSTN 6, LEC 8, and telephone line 16.

Although site A may attempt to communicate with site B, site A may not be able to reach site B for various reasons. For example, site B may be currently

engaged through telephone 12 with another site. By way of another example, site B

may be utilizing their computer 14 to access the Internet 4 through telephone line 16

and PSTN 6. By way of a final example, site B may simply be configured to forward

all incoming calls to another site.

5   The present invention provides mechanisms for forwarding calls that are

destined for a particular user (e.g., site B) to a database. Voice messages may then be

obtained, stored within the database, and later accessed by the particular user via the

Internet 4. As shown, phone calls from site A may be forwarded to a phone service

center 28 through telephone lines 24 and 26. Phone service center 28 then operates to

10   obtain a voice message from the caller of the forwarded call and store the voice

message within a user database 30. The voice message is stored in any suitable

format that is accessible through the Internet 4.

As shown, the phone service center 28 is also coupled with the Internet 4

through line 32 so that the message database 30 of the phone service center 28 may be

15   accessed by a user. For example, one or more calls to site B may be forwarded to

phone service center 28, and messages for site B are then stored within the message

database 30. The message database 30 may be accessed through the Internet 4 from

the intended destination (e.g., site B) or any other site that has access to the Internet 4.

For example, the users of site B may also access their voice messages through a

20   remote computer site.

Additionally if a user of site B is connected to the Internet 4 through computer

14, the user may also access the phone messages while they are still connected to the

Internet 4. In one embodiment, voice messages are stored as digital sound files

within the message database 30. Any suitable compressed audio format, such as

RealAudio, GSM or True Speech may be utilized. The user of site B may then play

the digitized sound file on their local computer 14. In other words, digitized sound

files may be downloaded via the Internet 4 and PSTN 6 to be played on computer 14.

Of course, the voice messages may be stored as any suitable format that is accessible

5   over a data network.

Additionally, the user of site B may be notified of new messages that are

stored within message database 30. Any suitable mechanism may be used to

implement notification. For example, the user may be notified through specialized

software on computer 14 at site B when they are coupled to the Internet 4. The user

10   may then chose to play the recorded sound file. Alternatively, the user may be

notified through a pager that they have received a new message within the message

database 30. The user may then access their new messages within the database 30

through a remote telephone or computer site or through their own computer 14 at site

B. By way of a final example, the user may be notified thorough email that they have

15   received a new message. The new message may also be attached as a sound file to

the email message. Additionally, the user may access the sound file through the

Internet 4 after being notified through email.

Figure 1B is a diagrammatic representation of the phone service center 28 of

Figure 1A in accordance with one embodiment of the present invention. As shown,

20   the phone service center 28 includes a phone server 50 that generally handles

incoming phone messages received on line 26, a database server 52 that manages the

database 30, and a web server 54 that notifies users of new voice messages and allows

access to the message database 30 via the Internet.

Although the phone service center 28 is shown as having three separate servers, of course, the various functions of each server may be implemented on one or more servers depending on the particular requirement of the application. Additionally, each server may be located at physically separate sites, as well as a

5   common site. The database 30 may be comprised of any number and type of databases. Incoming calls may be received into the phone server 50 on one or more lines. Each line may be utilized to handle forwarded calls or each line may be utilized for different services (including the handling of forwarded calls). Additionally, notification functions may not be incorporated within the present

10   invention. Instead, forwarded callers are allowed to leave messages which are simply stored in a format that is accessible by the user.

Although the present invention is described in terms of accessing voice messages through the Internet, of course, any suitable data network may be utilized to access the voice messages. For example, the messages may be stored within a local

15   area network (LAN) or wide area network (WAN) and accessed according to the particular network protocols.

The mechanisms of the present invention may be implemented on any suitable combination of hardware and/or software. In one embodiment, each server is in the form of a PC server, such as a Compaq server. The phone server may be in the form

20   of Dialogic Telephony Equipment. An Internet Information Server 4 (IIS4) may be utilized for the web server 54, and is available from Microsoft. An SQL server 7.0 from Microsoft works well as the database server 52.

When the phone server 50 receives a new voice message on line 26, a user database 30 may be accessed through database server 52 to determine whether the

incoming messages is intended for a valid user. In one embodiment, the phone server

50 communicates with the database server 52 via the scripting language ASP (Active

Server Pages) and the web server 54. ASP facilitates communication via the

prevalent language used by web servers, HTML. Thus, each server may be located at

5   different sites and still access other servers via the web server 54.

In addition to determining whether the user is valid, other user information

may be accessed through the user database 30. For example, custom messages for

each user may be played to each forwarded caller. After a particular user is validated,

the database server may then store a message from the caller within the message

10   database 30.

The web server 54 may then be utilized to notify the user that they have

received a new message. As described above, the user may be notified in various

ways. As shown, the user may be notified by pager 56a, email box 56b, through their

PC 56c (*e.g.,* via an instant chat message), or through a specialized software agent

15   56d. For example, the user PC may include agent software through which the user

may be notified about new messages while they are coupled to the Internet.

Figure 2 is a flowchart representing a process 200 for handling forwarded

calls in accordance with one embodiment of the present invention. For example, this

process 200 may be implemented within the servers 50, 52, and/or 54 of the phone

20   server center 28 of Figure 1B. In other words, when a caller attempts to call a user

and the caller's telephone call is forwarded to the phone service center (as opposed to

the attended call receiver), this process 200 represents one example implementation

of how the call is handled after it is forwarded to the phone service center 28.

Initially, a forwarded call and its associated user identification are received by the phone center (*e.g.*, 28 of Figures 1A and 1B) in operation 202. The user identification is associated with the person that the caller is trying to reach. The associated user identification may have any suitable format. In one embodiment, the

5   user identification is in the form of the ANI of the intended call receiver. The ANI is associated with the destination phone number that the caller is attempting to call. The incoming call may also include associated caller information, such as the DNIS of the caller. As is well known to those skilled in the art, each caller has a unique DNIS and each call receiver has a unique ANI that are associated with the particular phone

10 number of the caller and call receiver, respectively. Various mechanisms may also be included for determining the phone number of the caller when the caller has a block on their caller identification (or DNIS). For example, the caller may be asked to use their touch tone buttons to enter their phone number.

The user database (*e.g.*, database 30 of Figures 1A and 1B) is then searched

15 for the user identification. Within the user database, a particular identification will be associated with a set of user information for a particular user. In one embodiment, the user database will only include user identifications and user information for users that have requested to have forwarded telephone calls handled by the phone center (*e.g.*, 28 of Figure 1B). Additionally, the user database may be updated for various

20 reasons (*e.g.*, users who fail to pay for handling forwarded messages are deleted from the database or users who change their phone numbers).

The user information within the user database may include any relevant information that may facilitate handling of forwarded calls, as well as maintaining such call handling services for each user. For example, the user information may

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include the user's first and last name, an agent flag indicating whether the user is an agent user, a pager flag indicating whether the user is a pager user, an email flag indicating whether the user is a email user, and the associated email address of the user.

5   All of this user information may also be associated with a unique identifier, such as the ANI of the call receiver. Preferably, if the user information is used for other Internet services, besides forwarded call handling, the unique identifier may correspond to more generic information obtained from the user. Other Internet services may include email services or web site services, for example. In one

10   embodiment, the unique identifier is generated from information that is utilized by all of the Internet services that utilize the same user database and are available through the Internet.

       In one specific embodiment, the user provides an email address when signing up for any of these Internet services, and a unique identifier is generated from the

15   user's email prefix. Specifically, each letter of the email prefix is matched to a corresponding telephone number. For example, the letters "a, b, and c" are all matched to the number "2". By way of a specific example, a user using email address dufour@pagoo.com may request a service, such as forwarded call handling. The email prefix "dufour" is matched letter by letter to corresponding telephone numbers.

20   The resulting user identifier is "383687". If another user has the same number, another number is appended to the end (e.g., 3836871). Additionally, if the email prefix is too long, the user identifier size may be limited. For example, the user identifier may be limited to 10 digits. However, the length may be increased again (e.g., to 11 digits) to distinguish between duplicate user identifiers.

After the user identifier is looked up within the user database, it is then determined whether the user is a valid user in operation 206. For example, it is determined whether the call receiver is a registered user whose user identifier and associated user information is located within the user database. Additionally, it may

5 be determined whether the caller is a valid caller. For instance, forwarded calls from one or more selected callers may be automatically rejected. This determination may be based on the caller's DNIS. If the user is not a valid user (or the caller is not a valid caller), the call is terminated in operation 208. Of course, any suitable mechanism may be provided for notifying the caller that his call has not reached the

10 call receiver. For example, a message may be played to the caller indicating that the user's line is busy and to try again later.

If the user is valid, a custom greeting may be obtained from the user database (if available) and played for the caller in operation 210. The greeting may be based on the caller's identification (*e.g.*, DNIS). The caller is then allowed to record a voice

15 message in operation 212. The voice message is then digitized and formatted in operation 214, and the message database is updated with the formatted voice message in operation 216. In one embodiment, the formatted voice message takes the form of a sound file. The formatted voice message may be stored within the database in any suitable configuration. For example, all of the sound files that correspond to various

20 voice messages may form a linked list that is associated with a particular user.

In anther embodiment, each entry within the message database includes the following fields: user identifier, formatted voice message, date, message identifier, caller ID, and length. The user identifier is the unique number that was generated from the user's email prefix. The formatted voice message may include the voice

message itself or a reference to the voice message (*e.g.*, a pathname and filename). The date (and/or time) may also be included. Additionally, each formatted voice message may be associated with a message identifier to distinguish between messages that may have occurred at the same date (and/or time). The caller ID is the user's

5   caller identification (*e.g.*, DNIS). Of course, this list of fields is merely illustrative and is not meant to limit the scope of the invention. For example, any of the listed fields may be excluded and other nonlisted fields may be added. A table may also be included to match the user identifier, which is based on the user's email, with the user's phone number.

10   The user is then notified of new messages in operation 218. The call may then be terminated in operation 208. Of course the call may be terminated prior to digitizing and formatting the voice message in operation 214, prior to updating the message database in operation 216, or prior to notifying the user in operation 218. The message handling process 200 then ends.

15   A user may be notified of forwarded calls and/or new messages any suitable manner. For example, the user may be notified through agent software that is set up on the user's PC. The agent generally provides mechanisms for allowing a user to receive notification of forwarded calls and/or new messages that are handled while the user is logged onto the Internet.

20   Figure 3 is a flowchart representing the process 300 for setting up an agent on a user's computer in accordance with one embodiment of the present invention. In other words, when new messages are recorded as sound files within the database 30 of the phone center 28, the web server 54 of the phone server center 28 notifies the user of the voice messages. The user may then download and play the voice

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messages or the user may choose to access and play the recorded sound files at a later time.

Initially, an Internet connection is established (*e.g.*, by the user) in operation 302. The agent then contacts the phone center's web server in operation 304. That is,

5   the agent contacts the phone center through the Internet. The web server then stores Internet connection information for the particular user in operation 306. As is well known to those skilled in the art, when a user accesses the Internet, a unique address is assigned to the user's access location. This unique address may be used as the Internet connection information by the web server.

10   The agent then checks for any messages via the web server of the phone center in operation 308. Of course, this operation is optional, and the agent may simply wait to be contacted by the web server of the phone center when a new message is received. However, a user may wish to be notified of any messages that were stored while the user was off line.

15   It is then determined whether there are any new messages in operation 310. If there are new messages, the user may then receive and play the new digitized messages, for example, as sound files in operation 316. Alternatively, the user may choose to not play the messages at this time. If there are no new messages in operation 310 or the new messages have been played already in operation 316, the

20   agent then goes into an active listening mode in operation 312.

In the active listening mode, the agent is set up to receive notification from the web server of the phone center. In other words, the user may then be notified of any messages that are received while the user is logged onto the Internet. In one embodiment, it is then determined whether there is any contact from the web server

of the phone center in operation 314. The agent continues to listen in operation 312

until contact is made by the web server. Any recorded messages may then be

received and played by the user in operation 316. The agent continues an active

listening mode, as long as the user is logged in. Thus, the user continues to receive

5   notification of any new messages while they are logged in to the Internet. After the

user is notified, she may then chose to play the new messages in operation 316.

As described above, the user may be notified in various ways, besides through

an agent, that a call has been forwarded and/or voice messages are available. That is,

after forwarded calls are handled by the phone center, the user may be notified that

10   new messages may be accessible. Figure 4 is a flowchart representing the operation

218 of Figure 2 of notifying the user in accordance with one embodiment of the

present invention. Initially, it is determined whether the user is an agent user in

operation 402. If the user is an agent user, information is obtained regarding the last

Internet connection in operation 404. In one embodiment, when the user connects to

15   the Internet, the agent contacts the web server of the phone center and Internet

connection information is collected by the web server. (See operations 302, 304, and

306 of Figure 3).

An attempt to contact the user through the agent is then made in operation

406. Contact may be attempted in any suitable manner. For example, if the user is

20   coupled with the Internet, the user may be notified with an audible or visual

notification. By way of specific example, a telephone ring may be played through the

user's computer speakers. Additionally, a notification graphic may be presented to

the user within the user's computer display. The user may then select the graphic,

access, and/or play any recorded messages. It is then determined whether contact has

been established with the user in operation 408. For example, it is determined whether the user is logged in and the agent is in active listening mode. If contact was successful, the user was also notified of the new messages and allowed to receive and play the new messages in operation 406.

5   If the contact was not successful or the user is not an agent user, it may then be determined whether the user is a pager user in operation 410. If the user is a pager user, information regarding the user's pager is obtained in operation 412. For example, the user's pager number may be obtained. An attempt to contact the user through her pager is then made in operation 414. For example, the user may be

10   notified that she has a new message that may be accessed through the Internet or through the telephone. It may then be determined whether the user has been successfully contacted in operation 416. In one embodiment, the page was successful if a message was left on the user's pager, and the page was unsuccessful if a message was not left on the user's pager (e.g., because the pager was off or busy). If pager

15   contact is successful, the notification process ends.

If the pager contact is not successful (e.g., a pager message was not left for the user) or the user is not a pager user, it may then be determined whether the user is an email user in operation 418. Alternatively, after a predetermined period of time, the user may be paged again. If the user is not an email user, the notification process

20   ends. In this case (the user cannot be notified by agent, pager, or email), messages may be accessed at the user's initiation. However, if the user is an email user, information regarding the user's email address is obtained in operation 420. An attempt to contact the user through email is then made in operation 422. For example, the user is sent an email message indicating that they have new sound files

to access within the database 30 of the phone center 28. The sound files may also be attached to the email message. The notification process 218 then ends.

The above notification process includes sequentially trying to notify the user via various notification mechanisms. For example, first an agent notification is 5 attempted, and then a pager notification is attempted. However, two or more of these notification mechanisms may be attempted simultaneously. For instance, the user may be notified simultaneously through an agent and a pager.

In the previous described embodiment, it may be assumed that the user has already signed up to have certain calls forwarded under various conditions. For 10 example, the user may have requested call forwarding from a particular telephone company. The user may have chosen to have calls forwarded when their telephone line is busy, no one is answering, or for a particular period of time.

Although the present invention may be implemented for a particular user that has already signed up for call forwarding, the present invention may also include 15 features that automatically sign the user up for call forwarding when the user signs up for forwarded call handling. In other words, when the user signs up for the service to access forwarded messages through the Internet, the user can also have his telephone calls automatically forwarded to the relevant phone center without specifically making such a forwarding request.

20 Figure 5 is a flowchart representing a process 500 for automatically signing a user up for call forwarding in accordance with one embodiment of the present invention. Initially, the user makes a request for call forwarding and/or forwarded call handling in operation 502. The database is then searched for the phone company that serves the user's area code in operation 504. One or more phone companies may

- 24 -

serve a particular area code. Thus, a plurality of phone companies may be displayed for the user in operation 506. The user then selects the phone company that they currently use in operation 508.

Fees may be displayed and the order may then be confirmed in operation 510.

5   For example, the user may be notified of the various fees (*e.g.*, monthly fees and set up fee) that are associated with call forwarding. The user may also be asked to agree to various legal terms. After the order is confirmed and accepted by the user, the orders may then be organized by company in operation 512. In other words, the orders are consolidated from various users for each company in operation 512. The

10 consolidated orders are then sent to each company via fax or email in operation 514. Various responses from the various phone companies are then tracked in operation 516. In other words, it is determined when each order is processed or whether a particular order is rejected. The user may then be contacted when the order is accepted in operation 518. After the automatic forwarding order is accepted, the user

15 may then begin to use the forwarding features of the present invention. Preferably, the user may choose to receive updates on the above described process. For example, the user may be updated when the order is placed, if the order is delayed, and after the order is accepted.

Information for each telephone company may be configured within a database

20 in any suitable manner to facilitate a user being automatically being signed up for call forwarding. The telephone information may include the name of the telephone company and the area code that is served by the telephone company. When a user makes a request for call forwarding, he may be asked for his area code, which is then matched to one or more telephone numbers that serve the user's area code. The

telephone information also preferably includes the name of the forwarding feature. Since different companies may use different names for the call forwarding features, the correct name of the forwarding feature is used when placing an order to the telephone company.

5   The telephone company information may also include costs for setting up the forwarding feature. These costs may be billed to the user or to the forwarded call handling service, as part of such service. Additionally the information may include an order telephone number, fax number, email, etc. This order information may be presented to the user so that he may set up his own call forwarding when the
10   automatic sign up process 500 fails.

Figures 6A and 6B illustrate a computer system 900 suitable for implementing embodiments of the present invention. Figure 6A shows one possible physical form of the computer system. Of course, the computer system may have many physical forms ranging from an integrated circuit, a printed circuit board and a small handheld
15   device up to a huge super computer. Computer system 900 includes a monitor 902, a display 904, a housing 906, a disk drive 908, a keyboard 910 and a mouse 912. Disk 914 is a computer-readable medium used to transfer data to and from computer system 900.

Figure 6B is an example of a block diagram for computer system 900.
20   Attached to system bus 920 are a wide variety of subsystems. Processor(s) 922 (also referred to as central processing units, or CPUs) are coupled to storage devices including memory 924. Memory 924 includes random access memory (RAM) and read-only memory (ROM). As is well known in the art, ROM acts to transfer data and instructions uni-directionally to the CPU and RAM is used typically to transfer

data and instructions in a bi-directional manner. Both of these types of memories may include any suitable of the computer-readable media described below. A fixed disk 926 is also coupled bi-directionally to CPU 922; it provides additional data storage capacity and may also include any of the computer-readable media described

5   below. Fixed disk 926 may be used to store programs, data and the like and is typically a secondary storage medium (such as a hard disk) that is slower than primary storage. It will be appreciated that the information retained within fixed disk 926, may, in appropriate cases, be incorporated in standard fashion as virtual memory in memory 924. Removable disk 914 may take the form of any of the computer-

10   readable media described below.

CPU 922 is also coupled to a variety of input/output devices such as display 904, keyboard 910, mouse 912 and speakers 930. In general, an input/output device may be any of: video displays, track balls, mice, keyboards, microphones, touch-sensitive displays, transducer card readers, magnetic or paper tape readers, tablets,

15   styluses, voice or handwriting recognizers, biometrics readers, or other computers. CPU 922 optionally may be coupled to another computer or telecommunications network using network interface 940. With such a network interface, it is contemplated that the CPU might receive information from the network, or might output information to the network in the course of performing the above-described

20   method steps. Furthermore, method embodiments of the present invention may execute solely upon CPU 922 or may execute over a network such as the Internet in conjunction with a remote CPU that shares a portion of the processing.

In addition, embodiments of the present invention further relate to computer storage products with a computer-readable medium that have computer code thereon

for performing various computer-implemented operations. The media and computer code may be those specially designed and constructed for the purposes of the present invention, or they may be of the kind well known and available to those having skill in the computer software arts. Examples of computer-readable media include, but are

5   not limited to: magnetic media such as hard disks, floppy disks, and magnetic tape; optical media such as CD-ROMs and holographic devices; magneto-optical media such as floptical disks; and hardware devices that are specially configured to store and execute program code, such as application-specific integrated circuits (ASICs), programmable logic devices (PLDs) and ROM and RAM devices. Examples of

10   computer code include machine code, such as produced by a compiler, and files containing higher level code that are executed by a computer using an interpreter.

Although the foregoing invention has been described in some detail for purposes of clarity of understanding, it will be apparent that certain changes and modifications may be practiced within the scope of the appended claims. It should be

15   noted that there are many alternative ways of implementing both the process and apparatus of the present invention. For example, the user may be notified of new messages through any suitable "instant chat" software, such as Internet Relay Chat (IRC), ICQ, and AOL Messenger (AIM).

Accordingly, the present embodiments are to be considered as illustrative and

20   not restrictive, and the invention is not to be limited to the details given herein, but may be modified within the scope and equivalents of the appended claims.

CLAIMS

WHAT IS CLAIMED IS:

1.   A method for handling telephonic messages within a data network, the method comprising:

5   receiving a forwarded call from a caller, the forwarded call being intended for a particular user; and

storing a voice message associated with the forwarded call in a format that is accessible through a data network by the particular user.

2.   A method as recited in claim 1 further comprising notifying the

10   particular user that the forwarded call has been received.

3.   A method as recited in claims 1 or 2 further comprising:

prior to storing the voice message, determining whether the particular user is valid,

wherein the voice message is stored only when the particular user is

15   valid.

4.   A method as recited in claim 3 wherein it is determined whether the particular user is valid by searching a user database for a user identification associated with the forwarded call.

5.   A method as recited in claim 4 wherein the user identification is in the

20   form of an ANI or a DNIS.

6.   A method as recited in claims 4 or 5 further comprising when the particular user is valid and a custom greeting is associated with the user identification within the user database, playing the custom greeting message for the caller.

7.   A method as recited in claim 6 further comprising determining an identity of the caller, wherein the custom greeting is also associated with the identify of the caller.

8.   A method as recited in any of claims 1-7 further comprising:

    determining an identity of the caller; and

    notifying the particular user of the determined identity of the caller.

9.   A method as recited in claim 8 wherein the identity of the caller is determined from a DNIS of the caller associated with the forwarded call.

10.   A method as recited in claim 2 wherein the particular user is notified through the data network when the user is in communication with the data network.

11.   A method as recited in claims 2 or 10 wherein the particular user is notified via an email message.

12.   A method as recited in claims 2 or 10 wherein the particular user is notified via an instant chat message.

13.   A method as recited in claims 2 or 10 wherein the particular user is notified through agent software residing on a computer being used by the particular user.

14.   A method as recited in claims 2 or 10 wherein the format that is used to store the voice message is a sound file that is playable by the particular user while the particular user continues to be in communication with the data network.

15.   A method as recited in claim 14 further comprising converting the sound file to a text file.

16.   A method as recited in any of claims 1-15 wherein the format that is used to store the voice message is a sound file.

17.   A method as recited in claim 16 wherein the sound file is also compressed.

18.   A method as recited in any of claims 1-15 wherein the voice message is stored within a message database and associated with the particular user.

19.   A method as recited in any of claims 1-18 further comprising:

receiving a request from the particular user to set up call forwarding; and

automatically signing the particular user up for call forwarding when the request is received.

20.   A method as recited in claim 19 wherein the particular user is automatically signed up for call forwarding by:

determining the particular user's area code;

determining which telephone companies are associated with the particular user's area code;

displaying the associated telephone companies to the particular user so that the particular user may select a telephone company; and

sending an order for call forwarding to the selected telephone company

after the particular user makes a selection.

21.   A method as recited in claim 20 further comprising:

tracking the order to determine when the order is accepted by the

5   selected telephone company; and

contacting the particular user to indicate that their order was accepted

when the selected telephone company accepts the order.

22.   A method as recited in claims 20 or 21 wherein determination of the

telephone companies associated with the area code of the particular user is made by

10   searching a database having a plurality of telephone companies associated with each

area code.

23.   A method as recited in any of claims 1-22 further comprising

associating a user identifier with the particular user.

24.   A method as recited in claim 23 further comprising generating the user

15   identifier from the user's email address.

25.   A method as recited in claim 24 wherein each letter of the user's email

prefix is converted into a corresponding telephone number.

26.   A computer readable medium containing computer codes for handling

telephonic messages within a data network, the computer readable medium

20   comprising:

computer code for receiving a forwarded call from a caller, the

forwarded call being intended for a particular user; and

computer code for storing a voice message associated with the forwarded call in a format that is accessible through a data network by the particular user.

27.   A computer readable medium as recited in claim 26 further comprising computer code for notifying the particular user that the forwarded call has been received.

28.   A computer readable medium as recited in claims 26 or 27 further comprising:

computer code for determining whether the particular user is valid prior to storing the voice message,

wherein the voice message is stored only when the particular user is valid.

29.   A computer readable medium as recited in claim 28 wherein it is determined whether the particular user is valid by searching a user database for a user identification associated with the forwarded call.

30.   A computer readable medium as recited in claim 29 wherein the user identification is in the form of an ANI or a DNIS.

31.   A computer readable medium as recited in any of claims 27-30 further comprising:

computer code for determining an identity of the caller; and

computer code for notifying the particular user of the determined identity of the caller.

32.   A computer readable medium as recited in claim 31 wherein the identity of the caller is determined from a DNIS of the caller associated with the forwarded call.

33.   A computer readable medium as recited in claim 27 wherein the

5   particular user is notified through the data network when the user is in communication with the data network.

34 .   A computer readable medium as recited in any of claims 26-33 further comprising:

computer code for receiving a request from the particular user to set up

10   call forwarding; and

computer code for automatically signing the particular user up for call forwarding when the request is received.

35.   A met computer readable medium as recited in claim 34 wherein the particular user is automatically signed up for call forwarding by:

15   determining the particular user's area code;

determining which telephone companies are associated with the particular user's area code;

displaying the associated telephone companies to the particular user so that the particular user may select a telephone company; and

20   sending an order for call forwarding to the selected telephone company after the particular user makes a selection.

36.   A computer readable medium as recited in claim 35 further comprising:

computer code for tracking the order to determine when the order is

accepted by the selected telephone company; and

computer code for contacting the particular user to indicate that their

order was accepted when the selected telephone company accepts the order.

5   37.   A method for accessing a database of a first computer system through

a data network, the database being arranged to hold voice messages received through

a first telephone line, the method comprising:

accessing the data network from a second computer system via a

second telephone line;

10   listening for a notification from the first computer system, the

notification indicating that a telephonic call that was initially directed to the

second telephone line has been forwarded to the first telephone line; and

after receiving the notification, accessing the database of the first

computer system to determine whether a voice message corresponding to the

15   forwarded call has been stored,

wherein the database is accessed without disconnecting the second

computer system from the data network.

38.   A method as recited in claim 37 further comprising checking the

database for voice messages prior to listening for the notification indicating that a

20   telephonic call has been forwarded.

39.   A method as recited in claim 38 further comprising playing the voice

messages on the second computer system when voice messages are present in the

database.

40.   A method as recited in claim 37 further comprising playing the voice message corresponding to the forwarded call when the voice message has been stored.

41.   A computer readable medium containing computer codes for accessing

5   a database of a first computer system through a data network, the database being arranged to hold voice messages received through a first telephone line, the computer readable medium comprising:

computer code for accessing the data network from a second computer system via a second telephone line and;

10   computer code for listening for a notification from the first computer system, the notification indicating that a telephonic call that was initially directed to the second telephone line has been forwarded to the first telephone line; and

computer code for accessing the database of the first computer system

15   to determine whether a voice message corresponding to the forwarded call has been stored after receiving the notification,

wherein the database is accessed without disconnecting the second computer system from the data network.

42.   A computer readable medium as recited in claim 41 further comprising

20   computer code for checking the database for voice messages prior to listening for the notification indicating that a telephonic call has been forwarded.

43.   A computer readable medium as recited in claim 42 further comprising computer code for playing the voice messages on the second computer system when voice messages are present in the database.

44.   A computer readable medium as recited in claim 41 further comprising computer code for playing the voice message corresponding to the forwarded call when the voice message has been stored.

45.   A method for automatically signing up a subscriber for call forwarding, the method comprising:

maintaining a database having a plurality of area codes that are each associated with one or more telephone companies that serve the each area code;

receiving a request from a particular user to sign up for call forwarding, the request including a user phone number and a user area code for which the particular user wishes call forwarding activated;

searching the database for the user area code and corresponding telephone companies that serve such user area code when the request is received;

presenting the telephone companies that serve the user area code to the particular user; and

when the particular user selects a one of the presented telephone companies, placing an order for call forwarding to be activated for the user phone number, the order being placed with the selected telephone company.

46.   A method as recited in claim 45 further comprising:

tracking the order to determine when the order is accepted by the selected telephone company; and

contacting the particular user to indicate that their order was accepted when the selected telephone company accepts the order.

47.   A computer readable medium containing computer codes for automatically signing up a subscriber for call forwarding, the computer readable medium comprising:

computer code for maintaining a database having a plurality of area

5   codes that are each associated with one or more telephone companies that serve the each area code;

computer code for receiving a request from a particular user to sign up for call forwarding, the request including a user phone number and a user area code for which the particular user wishes call forwarding activated;

10   computer code for searching the database for the user area code and corresponding telephone companies that serve such user area code when the request is received;

computer code for presenting the telephone companies that serve the user area code to the particular user; and

15   computer code for placing an order for call forwarding to be activated for the user phone number when the particular user selects a one of the presented telephone companies, the order being placed with the selected telephone company.

48.   A computer readable medium as recited in claim 47 further

20   comprising:

computer code for tracking the order to determine when the order is accepted by the selected telephone company; and

computer code for contacting the particular user to indicate that their order was accepted when the selected telephone company accepts the order.

49.   An   apparatus   for   handling   forwarded   telephonic   messages, comprising:

a database manager arranged to maintain a database of user information for a plurality of users and a plurality of associated user

5   identifications and a database of formatted messages associated with forwarded calls of the users;

a forwarded call handler arranged to receive a first forwarded call that is originally directed at a first call receiver that is associated with a first user, the first call receiver being configured to forward calls to the phone call

10   handler, the forwarded call handler being further arranged to format a first voice message associated with the first forwarded call and direct the database manager to store the first formatted voice message within the message database such that they are retrievable by the first user through a data network; and

15   a data network interface arranged to provide access to the first formatted message within the message database by the first user over the data network.

50.   An apparatus as recited in claim 49 wherein the data network interface is further arranged to notify the first user when the first forwarded call has been

20   received by the forwarded call handler.

51.   An apparatus as recited in claim 50 wherein the first user is notified by a mechanism selected from a group consisting of sending an email message to the first user, sending a page to the first user, and contacting the first user through the data network while the first user is still connected to the data network.

52.   An apparatus as recited in claim 50 wherein the database manager is arranged to include a plurality of fields within the user information of the first user.

53.   An apparatus as recited in claim 52 wherein the fields include an agent flag indicating whether the first user is an agent user and the data network interface

5   notifies the first user by attempting to contact the first user through the data network and an agent on the first user's computer.

54.   An apparatus as recited in claims 52 or 53 wherein the fields include a pager flag indicating whether the first user is a pager user and the data network interface notifies the first user by attempting to contact the first user through the first

10   user's pager.

55.   An apparatus as recited in any of claims 52-54 wherein the fields include an email flag indicating whether the first user is an email user and the data network interface notifies the first user by attempting to contact the first user through email.

15   56.   An apparatus as recited in claim 55 wherein the data network interface sends the first user an email message having the first formatted message attached to the email message.

Figure 1A

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Figure 1B

Forwarded Call
Handling

202

200

Receive forwarded call and
associated user identification

204

Look up user information within
user database based on user
identification

206

Valid
user?

Y   N

210

Obtain and play greeting from
user database

212

Caller records voice message

214

Digitize voice message

216

Update message database

218

Notify user

208

Terminate
call

End

Figure 2

Figure 3

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218

Notify User

402 Is user an
     Agent user? — N → 410 Is user a
                         pager user? — N → 418 Is user an
                                             email user? — N →

                │ Y   │ Y   │ Y
                ▼   ▼   ▼

404 Get information   Get information   Get information
     regarding last   regarding pager   regarding email
     internet
     connection   412   420

                │   │   │
                ▼   ▼   ▼

406 Attempt to   Attempt to   Attempt to
     contact user   contact user   contact user
     through Agent   through pager   through email

                │   414   422
                ▼   ▼

408 Success? — N →   Success? — N → 416

                │ Y   │ Y
                ▼   ▼

                End ◄──────────────────────────────────

Figure 4

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Auto Forwarding
Sign up

500

502
Request for forwarding received
from user

504
Search database for phone
companies that serve area code
of user

506
Display phone companies to
user for selection

508
User selects a phone company
from displayed list of phone
companies

510
Display fees and confirm order

512
Organize orders based on phone
company

514
Send orders for each phone
company via fax or email

516
Track responses to orders

518
Contact user when order is
accepted

End

Figure 5

SUBSTITUTE SHEET (RULE 26)
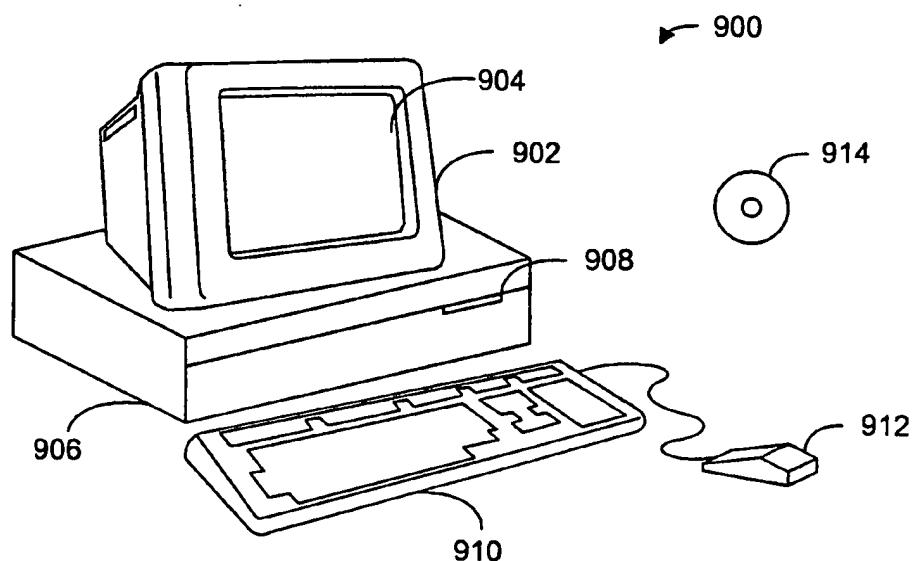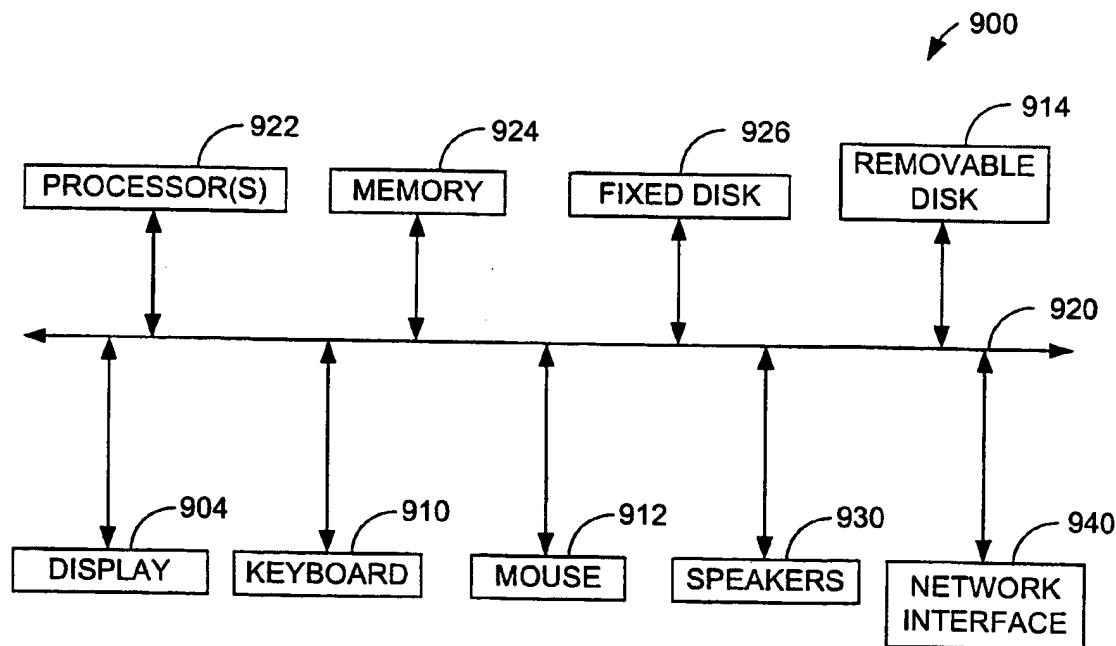
Figure 6A

Figure 6B

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7   H04M3/537   H04M7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7   H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	page 1, line 12 -page 2, line 17 page 3, line 30 - line 60	20-22, 35,36, 45-48

-/--

X	Further documents are listed in the continuation of box C.		X	Patent family members are listed in annex.

° Special categories of cited documents :

'A' document defining the general state of the art which is not considered to be of particular relevance

'E' earlier document but published on or after the international filing date

'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

'O' document referring to an oral disclosure, use, exhibition or other means

'P' document published prior to the international filing date but later than the priority date claimed

'T' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

'X' document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

'Y' document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

'&' document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 December 2000	29/12/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040. Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Gkeli, M

Form PCT/ISA/210 (second sheet) (July 1992)

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INTERNATIONAL SEARCH REPORT

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category ᶜ	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 47118 A (ERICSSON TELEFON AB L M ;HANSSON ALLAN (SE); TOENNBY INGMAR (SE)) 11 December 1997 (1997-12-11)	1-19,23, 24, 26-34, 37-44, 49-56
A		20-22, 25,35, 36,45,47
	page 4, line 5 -page 5, line 25 page 6, line 19 -page 10, line 29 page 12, line 19 -page 17, line 36 figures 1,2,5,6	

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A		20-22, 25,35, 36,45,47
	page 1, line 23 -page 6, line 4 page 6, line 33 -page 11, line 10 claims 1-8,14,15,18	

X	WO 98 52342 A (ERICSSON TELEFON AB L M) 19 November 1998 (1998-11-19)	1-19,23, 24, 26-34, 37-44, 49-56
A		20-22, 25,35, 36,45,47
	page 6, line 28 -page 12, line 3 page 15, line 21 -page 16, line 9 figure 7	

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

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